a relationship between color input signals to a color display device and color brightness output of the color display device; and

a means for storing a coefficient representation of the mathematical model in the color display device.

E10 cont'd.

REMARKS

In this Amendment, the Applicant has amended claims 1-19, 30 and 33. No claims have been cancelled or added. Accordingly, claims 1-19, 30, 31, 33 and 34 remain pending in the Application. The amended claims with revision markings are set forth in Appendix A.

In the Office Action, all claims were rejected under 35 U.S.C. § 103. Claims 1-4, 6, 7, 16-19 and 33-34 were rejected under Section 103 based on U.S. Patent No. 5,479,186 to McManus et al. ("the McManus reference") in view of U.S. Patent No. 4,386,345 to Narveson et al. ("the Narveson reference") and further in view of U.S. Patent No. 6,108,053 to Petitt et al. ("the Petitt reference"). Claims 8-13, 15 and 30-32 were rejected under Section 103 based on the McManus reference in view of the Petitt reference. Claim 5 was rejected under Section 103 based on the McManus reference in view of the Narveson reference, the Petitt reference, and further in view of U.S. Patent No. 4,379,292 to Minato et al. ("the Minato reference"). Claim 14 was rejected under Section 103 based on the McManus reference in view of the Petitt and Minato references.

With respect to claims 1-4, 6, 7, 16-19 and 33-34, the Examiner stated:

> 5. Claims 1-4, 6, 7, 16-19, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over McManus in view of Narveson et al., ("Narveson"), US Patent No. 4,386,345 and further in view of Petitt et al., (hereinafter Petitt), US 6,108,053.

McManus discloses a system for computing polynomial equation coefficients to represent an input-output color characteristic of a color display device that can be used further for calculating the look-up tables converting the input signal to a color display into a color brightness displayed on the screen of the color display device.

McManus further teaches that the computer performing the task of calibration is supplied with the data, which is generated through the spectroradiographic analysis of the monitor during the manufacturing of the latter (col. 5, lines 48-67).

McManus does not specifically disclose that the polynomial coefficients are stored in a data storage device or memory in said color display device. McManus rather discloses that the calculated coefficients are used for calculating look-up tables for each electron gun for consequently storing look-up tables by the computer.

Narveson teaches a color cathode ray tube having a "CRT personality PROM" containing the color/brightness characteristics of this particular CRT, input-output transfer characteristic included, which have been prepared during the CRT assembly (see abstract, col. 4, lines 3-38; col. 4, line 57 – col. 5, line 23).

Narveson also teaches storing polynomial coefficients for adjusting an electron beam focus in accordance with the reference brightness in the tube's personality PROM.

Neither McManus nor Narveson teach or suggest explicitly storing coefficient representation of color input-output characteristics, they rather teach the look-up tables, which are used for this purpose.

Petitt teaches a method for calibrating a color wheel system, wherein the derived correction coefficients are stored in the device memory of the wheel itself in order to associate these coefficients such that any color wheel could be used with any projector (column 8, line 30 – column 9, line 7).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the teaching of Narveson in the display calibration system of McManus in the part that transfer characteristic data of a particular

> display is being stored in the memory of that display, which is integral part of the display, so that it would not require calibration each time of the using it in different computer system (Narveson, col. 4, lines 20-26), or to store coefficients rather than the look-up tables produced by these coefficients in the display device itself as taught by Petitt. Even though Petitt uses a simple linear correction coefficients (column 4), which are practically would be equal to the first term of polynomial equations, it would have been obvious to one of ordinary skill in the art that the input-output characteristic could be presented by the polynomials of higher-order, such as 5 or 7, for example, as taught by McManus.
>
> As to claim 7, it is well known in the art that color correction is applicable to a color display of any type, be it VGA MultiSync CRT or LCD, or any other type, as long as it is used to display colors.
>
> As to claim 19, it is obvious that data can be stored in any type of memory capable of storing digital data, DDC (dual-dielectric cells) memory devices included, and since it would not bring any unexpected results it would have been obvious to one of ordinary skills to use it.
> Office Action, paragraph 5.

With respect to claims 8-13, 15 and 30-32, the Examiner stated:

> 6. Claims 8-13, 15 and 30-32 are rejected under 35 U.S.C. 103(a) as obvious over McManus in view of Petit.
>
> McManus discloses a system for computing polynomial equation coefficients to represent an input-output color characteristic of a color display device. McManus further teaches that the computer performing the task of calibration is supplied with the data, which is generated through the spectroradiographic analysis of the monitor during the manufacturing of the latter (col. 5, lines 48-67).
>
> McManus does not specifically disclose that the polynomial coefficients are communicated to said color display device for storage in data storage device associated with said color display device. McManus rather discloses that the calculated coefficients are used for calculating look-up tables for each electron gun for consequently storing look-up tables by the computer into a memory of the device driver (22) via the communication link (26).

Petitt teaches a method for calibrating a color wheel system, wherein the derived correction coefficients are stored in the device memory of the wheel itself in order to associate these coefficients such that any color wheel could be used with any projector.

It would have been obvious to one of ordinary skill in the art at the time of the invention to store coefficients produced by the calibration process of McManus in the memory of the display device itself as taught by Petitt, so that the display device itself as taught by Petitt, so that the display device could be used with any type of video source.

As to claim 10, it is well known in the art that color characteristics are changing with the temperature and most of the measurements in the world of testing are taken after the device under test is warmed up and its temperature is stabilized.

As to claim 11, it is obvious that data processed and stored in the computer system of McManus can be stored in any type of memory capable of storing digital data, DDC (dual-dielectric cells) memory devices included, and since it would not bring any unexpected results it would have been obvious to one of ordinary skills to use it.

Office Action, paragraph 6.

With respect to the rejection of claim 5, the Examiner stated:

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over McManus in view of Narveson and further in view of Petitt and further in view of Minato et al., ("Minato"), US 4,379,292.

McManus discloses a system for computing polynomial equation coefficients to represent an input-output color characteristic of a color display device.

Narveson teaches a color cathode ray tube having a "CRT personality PROM" containing the color/brightness characteristics of this particular CRT, input-output transfer characteristic included, which have been prepared during the CRT assembly. Neither of the above disclose expressly that a third order polynomial equation is used for representation, which predicts the brightness to within 0.3 foot-Lamberts for each input signal. McManus rather

teaches that acceptable curve fitting results are obtained when the degree of the polynomial is in order from 5 to 7.

Petitt teaches a method for calibrating a color wheel system, wherein the derived correction coefficients are stored in the device memory of the wheel itself in order to associate these coefficients such that any color wheel could be used with any projector.

Minato teaches a luminance characteristic curves for a color display that can be presented by a polynomial equations of a third order (see FIG. 1 and equation (19) in column 5, line 10. It would have been obvious to one of ordinary skill in the art that color brightness characteristic for each input signal can be presented by a plurality of coefficients utilized in a third order polynomial equation, and that the order can be arbitrarily picked up by a designer depending on required accuracy, 0.3 fL included.

Office Action, paragraph 7.

Finally, respect to the rejection of claim 14, the Examiner stated:

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over McManus in view of Petitt and further in view of Minato.

McManus discloses a system for computing polynomial equation coefficients to represent an input-output color characteristic of a color display device.

McManus does not discloses expressly that a third order polynomial equation is used for representation, which predicts the brightness to within 0.3 foot-Lamberts for each input signal. McManus rather teaches that acceptable curve fitting results are obtained when the degree of the polynomial is in order from 5 to 7.

Petitt teaches a method for calibrating a color wheel system, wherein the derived correction coefficients are stored in the device memory of the wheel itself in order to associate these coefficients such that any color wheel could be used with any projector.

Minato teaches a luminance characteristic curves for a color display that can be presented by a polynomial equations of a third order (see FIG. 1 and equation (19) in column 5, line 10. It would have been obvious to one of

> ordinary skill in the art that color brightness characteristic for each input signal can be presented by a plurality of coefficients utilized in a third order polynomial equation, and that the order can be arbitrarily picked up by a designer depending on required accuracy, 0.3 fL included.
>
> Office Action, paragraph 8.

The Applicant respectfully traverses these rejections. All of the rejections are based on combinations of McManus with either Narveson or Petitt (sometimes both). The Applicant will address herein the deficiencies of the rejections to the extent that they involve combining McManus with Narveson and/or Petitt. For at least the reasons set forth below, the various combinations of McManus, Narveson and Petitt set forth in the Office Action do not render the Applicant's claims obvious under Section 103 because (1) the combination of McManus with either Narveson or Petitt is not supported by evidence of why one of ordinary skill in the art would have made the combination, and (2) even if the combination of McManus with Narveson and/or Petitt is proper, such combination does not contain all the elements set forth in the Applicant's pending claims. Accordingly, the Applicant respectfully requests withdrawal of the rejections of all pending claims.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in

light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

The Examiner has failed to meet the required burden of providing *evidence* of a motivation for the combination of McManus with either Narveson or Petitt. Instead, the Examiner states merely that:

> It would be obvious to one of ordinary skill in the art at the time of the invention to use the teaching of Narveson in the display calibration system of McManus in the part that transfer characteristic data of a particular display is being stored in the memory of that display, which is integral part of the display, so that it would not require calibration each time of the using it in different computer system (Narveson, col. 4, lines 20-26), or to store coefficients rather than the look-up tables produced by these coefficients in the display device itself as taught by Petitt.
>
> Office Action, paragraph 5.

This statement is nothing more than an *unsupported* assertion about the teachings of McManus, Narveson and Petitt, not a convincing line of reasoning supported by the references of *why* one of skill in the art would combine the references.

The Federal Circuit recently overturned the Board, which had upheld an examiner's rejection in a similar situation. In *In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002), the examiner rejected the applicant's claims under 35 U.S.C. § 103 without giving the supporting motivation

to combine references. The Board subsequently affirmed the examiner's rejection. In overturning the Board's decision, the Federal Circuit stated that:

> When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. *See, e.g., McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 U.S.P.Q.2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references, "a question of fact drawing on the Graham factors).
>
> 'The factual inquiry whether to combine references must be through and searching.' *Id. It must be based on objective evidence of record.* This precedent has been reinforced in myriad decisions, and cannot be dispensed with. [citations omitted].
>
> *Lee*, 61 U.S.P.Q.2d at 1433 (emphasis added).

In the present case, the Examiner's unsupported assertions about the teachings of McManus, Narveson and Petitt does not meet the evidentiary standard required for combining references under Section 103. Indeed, the Examiner's assertions are nothing more than the use of impermissible hindsight in conjunction with the teachings of the Applicant's own disclosure.

Furthermore, Petitt is addressed to a wholly different type of device than either McManus or Narveson. One of ordinary skill in the art would have no motivation to employ the teachings of Petitt in a system of either McManus or Narveson. Specifically, Petitt is directed to the calibration of a display device that employs a color wheel. Moreover, the problems discussed in Petitt are induced by the use of a spinning color wheel. Even the title of the Petitt reference indicates its applicability to a color wheel system: "Method of Calibrating a Color Wheel System Having a Clear Segment." Petitt explains that the unique considerations of a color wheel system motivate its attempted solution:

> The layout of the color wheel itself has an impact on the functioning and interaction of various components of the system in FIG. 3. One example of a color wheel layout is shown in FIG. 4. While this is only intended as an example it is one that works under several constraints.
>
> Some of the constraints under which a color wheel is designed are: brightness; white-point; rotation speed; and flicker performance. With regard to brightness, the overall system brightness must be increased to a level that makes the trade off of color saturation of the primary colors worth it.
>
> Petitt, col. 6, lines 56-65.

Neither McManus nor Narveson is at all related to such a device. Accordingly, the teachings of Petitt would be applicable to a device having the characteristics of a color wheel, not the types of display devices disclosed in McManus or Narveson. One of ordinary skill in the art would not be motivated to include the teachings of Petitt in a system based on McManus or Narveson. For these reasons, the Applicant respectfully requests the Examiner to withdraw the rejection of claims 1-19, 30, 31, 33 and 34.

Even if proper, no combination of McManus with Petitt could render the present claims obvious. The calibration system disclosed in Petitt is directed to color wheel display projectors, which embody rotating color wheels. The calibration of color wheel devices is inapposite to the calibration of display devices disclosed and contemplated by the McManus and Narveson references. Indeed, it would not make sense to perform a calibration relevant to color wheel devices in either of the systems disclosed by McManus or Narveson, or to store data relevant to a color wheel in the devices taught by those references. Nor would it make sense to perform the calibrations described in McManus and Narveson on a color wheel device, such as the device disclosed in the Petitt reference. Any device resulting from the combination of the teachings of McManus and Petitt (or McManus, Narveson and Petitt) would be inoperative or would not

function in a manner contemplated by any of those references. Accordingly, no device resulting from the combination of McManus and Petitt (or McManus, Narveson and Petitt) could render the pending claims obvious.

For at least the reasons set forth above, the Applicant respectfully asserts that the rejections of the pending claims based on the combination of McManus with Petitt (or McManus, Narveson and Petitt) are improper. Accordingly, the Applicant requests withdrawal of the rejections of the pending claims (claims 1-19, 30, 31, 33 and 34) based upon the cited combinations of McManus with Petitt (including combinations of McManus with Narveson and Petitt).

If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Payment of Fees

This response is timely filed and does not present claims that require payment of a fee at this time. Accordingly, the Applicant respectfully submits that no fees are due at the present time.

General Authorization for Extensions of Time and Payment of Fees

Although this response is believed to be timely filed, the Applicant, in accordance with 37 C.F.R. § 1.136, hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefor. Furthermore, Applicant authorizes the Commissioner to charge the appropriate fee for any extension of time, any excess fees, or any other fees which may be due to Deposit Account No. 06-1315; Order No. NUHP:0018/FLE (P98-2336).

Respectfully submitted,

Date: September 19, 2002

Barry D. Blount

Barry D. Blount
Reg. No. 35,069
FLETCHER, YODER & VAN SOMEREN
P.O. Box 692289
Houston, TX 77269-2289
(317) 867-2497

APPENDIX A

Amended Claims Shown with Revision Markings

1. (Twice Amended) A system for storing equation coefficients in a color display device, [during a color display device manufacturing process, said] the equation coefficients to represent an input-output color characteristic of the color display device, [said] the system comprising:

a signal generator for generating an output signal that can be used by [said] the color display device to produce a predetermined pattern on a screen of [said] the color display device;

a general purpose computer coupled to [said] the signal generator and [said] the color display device, the general purpose computer providing [during the color display device manufacturing process] a plurality of first outputs to [said] the signal generator such that [said] the signal generator incrementally changes [said] the output signal from a first extreme to a second extreme such that a first color can be displayed on [said] the color display device in [said] the predetermined pattern, [said] the single color being displayed incrementally from a first brightness level to a second brightness level;

a photometer device positioned to measure the incremental brightness levels that can be displayed on [said] the color display device, [said] the photometer providing a brightness data for each incremental brightness level to [said] the general purpose computer;

[said] the general purpose computer correlates [said] the first outputs with [said] the brightness data to further calculate a plurality of coefficients that represent the signal input-to-first color output relationship of [said] the color display device;

and

[said] the general purpose computer stores [said] the plurality of coefficients in a memory of [said] the color display device. [during the color display device manufacturing process.]

2. (Once Amended) The system for computing of claim I, wherein [said] the general purpose computer further can provide [said] the plurality of coefficients to [said] the color display device.

3. (Once Amended) The system for computing of claim 1, wherein [said] the coefficients are for a polynomial equation that represents the signal input-to-first color output relationship of [said] the color display device.

4. (Once Amended) The system for computing of claim 1, wherein [said] the plurality of coefficients can be communicated to [said] the color display device for storage in a data storage device associated with [said] the color display device.

5. (Once Amended) The system for computing of claim 1, wherein [said] the plurality of coefficients can be utilized in a third order polynomial equation which predicts the brightness of [said] the first color to within 0.3 foot-lamberts for each input signal for [said] the color display device.

6. (Once Amended) The system for computing of claim 1, wherein [said] the first color is at least one of red, green, and blue.

7. (Once Amended) The system for computing of claim I wherein [said] the color display device can be at least one of a VGA monitor, a MultiSync monitor, a flat panel NCD display, a flat panel SPU display, a flat panel LCD display, a reflective LCD display, and a FED display device.

8. (Three Times Amended) A method of calculating a mathematical representation of the signal input-to-color brightness output relationship of a color display monitor [during a display device manufacturing process, said] the method comprising the steps of:

providing input signals having predetermined incremental changes between [said] the input signals to a color display device [during the display device manufacturing process] such that [said] the color display device produces a predetermined pattern on the color display device's screen;

measuring a brightness of at least a portion of [said] the predetermined pattern at each incremental change of [said] the input signal and providing [said] the measured brightness as brightness data to a general purpose computer;

correlating [said] the input signals with [said] the brightness data in [said] the general purpose computer;

calculating coefficients of a mathematical representation, in [said] the general purpose computer, of [said] the correlated input signals to [said] the brightness data;

storing [during the display device manufacturing process said] the coefficients in a memory device of [said] the color display device.

9. (Once Amended) The method of claim 8, wherein [said] <u>the</u> input signals represent at least one predetermined color that can be displayed on [said] <u>the</u> color display device.

10. (Once Amended) The method of claim 8, wherein prior to the step of providing a step of warming up [said] <u>the</u> color display device is performed.

11. (Once Amended) The method of claim 8, wherein [said] <u>the</u> memory device associated with [said] <u>the</u> color display device is a DDC memory.

12. (Three Times Amended) A color display device adapted to provide [during a color display device manufacturing process] a plurality of coefficients to a color display device driver circuit, [said] <u>the</u> coefficients being related to a signal-input-to-brightness-output transfer function of [said] <u>the</u> color display device, [said] <u>the</u> color display device comprising:

input/output circuitry for connecting [said] <u>the</u> color display device to a general purpose computer;

a display screen in communication with [said] <u>the</u> input/output circuitry;

a data storage device of the display screen, for storing, at least, a plurality of coefficients for a signal-input-to-brightness-output transfer function, [said] <u>the</u> plurality of coefficients being calculated after incremental signals are provided to [said] <u>the</u> color display device, via [said] <u>the</u> input/output circuit, such that a predetermined pattern is displayed on [said] <u>the</u> display screen, a brightness data of [said] <u>the</u> predetermined pattern is measured and correlated with each [said] <u>the</u> incremental signal, a transfer function, having coefficients, is calculated based on [said] <u>the</u>

correlation of [said] the incremental signals and [said] the brightness data, [said] the coefficients then being stored in [said] the data storage device, [said] the coefficients being available to a color display device driver circuit when [said] the color display device is connected to a general purpose computer.

13. (Once Amended) The color display device of claim 12, wherein [said] the transfer function is a polynomial equation.

14. (Once Amended) The color display device of claim 12, wherein [said] the transfer function is a third order polynomial equation.

15. (Once Amended) The color display device of claim 12, wherein [said] the color display device is a screen utilized by at least one of a personal computer, laptop computer, and computer monitor.

16. (Three Times Amended) A computer system comprising:

a general purpose computer, [said] the general purpose computer comprising a color display device driver;

a color display device connected to [said] the general purpose computer, [said] the color display device comprising a data storage device containing coefficients for a mathematical representation of an input-output transfer characteristic for the color display device stored [during a color display device manufacturing process, said] the mathematical representation

provided to [said] <u>the</u> color display device driver in order to aid the standardization of a color brightness.

17. (Once Amended) The computer system of claim 16, wherein [said] <u>the</u> data comprises coefficients to a polynomial transfer function that describes a relationship between an input signal to [said] <u>the</u> color display device and a color brightness on a screen of [said] <u>the</u> color display device.

18. (Once Amended) The computer system of claim 16, wherein [said] <u>the</u> data storage device is memory device.

19. (Once Amended) The computer system of claim 16, wherein [said] <u>the</u> memory device is a DDC memory associated [said] <u>the</u> color display device.

30. (Twice Amended) A method of color management for a color display device, the method comprising the steps of:

generating [during a color display device manufacturing process] a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

storing a coefficient representation of the mathematical model in a memory device of the color display device.

33. (Twice Amended) A color management system for a color display device, comprising:

a means for generating [during a color display device manufacturing process] a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

a means for storing a coefficient representation of the mathematical model in the color display device.